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REMARKS

Pending Claims

Applicants' agent wishes to express his sincere gratitude for the helpful discussions regarding this application during the Interview held on March 23, 2007 with Examiner Callie Shosho. The remarks that follow are based on these discussions.

Claims 1 and 40 have been amended to more clearly describe what Applicants regard as the invention. In particular, these claims have been amended to recite that the first chemical group comprises an organic group. Support for the amendment can be found throughout the specification, including, for example, page 7, lines 1-6. No new matter has been added. Claims 1, 5-15, 17-18, 21-25, 34, 35, and 40 are pending.

Rejection of Claims Under 35 U.S.C. § 102

Claims 1 and 8-13

The Examiner has rejected the above-identified claims as being anticipated by Moffatt et al. '932 (U.S. Patent No. 6,221,932).

In paragraph 3 of the Final Office Action, the Examiner incorporates by reference the rejection set forth in paragraph 4 of the Office Action mailed May 9, 2006. Furthermore, in paragraph 10 of the Final Office Action, the Examiner states that Applicants' arguments filed November 8, 2006 have been fully considered but are not persuasive. In particular, the Examiner states that, while Applicants argued that Moffatt et al. '932 is not a relevant reference since Moffatt et al. '932 discloses reacting pigment having attached aromatic ester groups with polymer that are not the type that undergo addition-elimination as presently claimed, the Examiner states that the aromatic group (i.e., the first chemical group) of Moffatt et al. '932 is of the formula  $R-(C=O)-O-Ph-Y$ , where Y includes fluorine and, as such, it would appear that the electrophilic fluorine in the aromatic ring will be eliminated and its

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position in the aromatic ring replaced by the nucleophile (amine-terminated polymer), as evidenced from page 1035 of *Organic Chemistry*.

Applicants respectfully disagree. During the Interview held on March 23, 2007 with Examiner Callie Shosho, the chemistry of the aromatic ester groups shown in Moffatt et al. '932 was discussed. In summary, these aromatic groups are not the types that under addition-elimination reactions, which involves replacement of the substituent by a reacting species by reaction on the aromatic ring. Instead, due to the types of substituents of the aromatic groups of Moffatt et al. '932, these groups undergo nucleophilic substitution or acylation reactions, as discussed by Moffatt et al. '932 (see column 4, lines 35-39), in which reaction occurs at the ester carbonyl. Thus, the groups identified by Moffatt et al. '932, which are shown in the diagram spanning columns 4 and 5, are not the aromatic groups recited in present claim 1.

Therefore, Applicants believe that claim 1 is not anticipated by Moffatt et al. '932. Furthermore, claims 8-13, which depend directly or indirectly from claim 1, recite further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by this reference.

Applicants therefore believe that claims 1 and 8-13 are not anticipated by Moffatt et al. '932 and respectfully request that this rejection be withdrawn.

Claims 1, 5, 8-9, 12, 14-15, 17-18, and 40

The Examiner has rejected the above-identified claims as being anticipated by PCT Publication No. WO 99/31175.

In paragraph 4 of the Final Office Action, the Examiner incorporates by reference the rejection set forth in paragraph 5 of the Office Action mailed May 9, 2006. Furthermore, in paragraph 10 of the Final Office Action, the Examiner states that Applicants' arguments filed November 8, 2006 have been fully considered but are not persuasive. In particular, the Examiner states that, while Applicants argued that WO 99/31175 is not a relevant reference against the present claims since this reference does not disclose modified pigment as presently claimed, the Examiner states that the third type of modified carbon black disclosed in WO

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99/31175 (carbon black having attached organic group to which is attached ionic or ionizable group to which is attached counterionic group) does disclose the presently claimed modified pigment. In addition, the Examiner states that, while Applicants argue that the groups are attached using counterion exchange, there is no requirement in the present claims regarding mechanism by which the groups attached to the pigment react with each other.

Applicants respectfully disagree. During the Interview held on March 23, 2007 with Examiner Callie Shosho, the third type of modified carbon black disclosed in WO 99/31175 was discussed. In summary, the groups disclosed in this reference would not be recognized by one skilled in the art as being electrophilic and nucleophilic groups, as recited in the present claims but rather as ionic or ionizable groups which undergo counterion exchange. No electrophilic/nucleophilic reaction is disclosed in relation to this type of modified product. Thus, the third type of modified carbon product does not anticipate the method of present claims 1 or 40.

Therefore, Applicants believe that claims 1 and 40 are not anticipated by WO 99/31175. Furthermore, claims 5, 8-9, 12, 14-15, and 17-18, which are directly or indirectly dependent from claim 1, recite further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by this reference.

Applicants therefore believe that claims 1, 5, 8-9, 12, 14-15, 17-18, and 40 are not anticipated by WO 99/31175 and respectfully request that this rejection be withdrawn.

Claims 1, 8-10, 12-13, and 40

The Examiner has rejected the above-identified claims as being anticipated by Kwan (U.S. Patent No. 6,235,829).

In paragraph 5 of the Final Office Action, the Examiner incorporates by reference the rejection set forth in paragraph 6 of the Office Action mailed May 9, 2006. Furthermore, in paragraph 10 of the Final Office Action, the Examiner states that Applicants' arguments filed November 8, 2006 have been fully considered but are not persuasive. In particular, the Examiner states that, while Applicants argued that Kwan is not a relevant reference against the

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present claims since there is no disclosure in Kwan that the pigment having attached first chemical group is prepared by reacting diazonium salt having the first chemical group with at least one type of pigment to form pigment having first chemical group, which the Examiner agrees with, absent evidence of criticality regarding the presently claimed process, since Kwan discloses pigment having attached first chemical group, it is the Examiner's position that Kwan meets the requirements of the present claims.

Applicants respectfully disagree. During the Interview held on March 23, 2007 with Examiner Callie Shosho, the pigments disclosed in Kwan were discussed. In summary, Kwan discloses a method of making a non-polar suspension of chargeable pigment particles by contacting pigment particles with a polymer resin having a reactive group, and the pigment particles are described as having surface anchoring groups which react with the reactive groups of the polymer (column 2, line 51 to column 3, line 26). Thus, as described in Kwan, covalent bond formation occurs between reactive groups of the polymer and the surface groups of the pigment (see column 4, lines 6-8). However, these surface groups are not groups attached by a diazonium salt, and, as a result, the reactivity of the surface groups in Kwan with a polymer would not be expected to be the same as the reactivity of groups attached by a diazonium salt. Other differences would also be expected and are discussed in the present application (for example, see page 1, lines 17-23). Therefore, the product of Kwan resulting from the reaction of these surface groups would also not be the same as the product of the present invention.

However, in order to place this application in condition for allowance, Applicants have amended claim 1 to recite that the first chemical group comprises an organic group. This further differentiates the method of the present invention from that of Kwan since the pigment having attached the first chemical group differs from the pigment that is reacted in Kwan.

Therefore, Applicants believe that claims 1 and 40 are not anticipated by Kwan. Furthermore, claims 8-10 and 12-13, which are directly or indirectly dependent from claim 1, recite further embodiments of the present invention and, for at least the reasons discussed above, are also not anticipated by this reference.

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Applicants therefore believe that claims 1, 8-10, 12-13, and 40 are not anticipated by Kwan and respectfully request that this rejection be withdrawn.

Claims 21-22, 24, 34-35, and 40

The Examiner has rejected the above-identified claims as being anticipated by Moffatt et al. '257 (U.S. Patent No. 6,323,257).

In paragraph 6 of the Final Office Action, the Examiner incorporates by reference the rejection set forth in paragraph 7 of the Office Action mailed May 9, 2006. Furthermore, in paragraph 10 of the Final Office Action, the Examiner states that Applicants' arguments filed November 8, 2006 have been fully considered but are not persuasive. In particular, the Examiner states that, while Applicants argued that Moffatt et al. '257 is not a relevant reference against the present claims since Moffatt et al. '257 clearly teaches modified pigment which is the reaction product of polymerization reaction with attached reactive group (i.e., 2-(sulfatoethyl) sulfone) and this is in direct contrast to the present claims that require modified pigment comprising pigment having attached at least one organic group which is the reaction product of at least one (2-sulfatoethyl) sulfone group and at least one nucleophilic polymer, which the Examiner agrees with, the end result of Moffatt et al. '257 is the same as presently claimed (i.e., the attachment of nucleophilic polymer to the reactive group that is attached to the pigment). The Examiner therefore concludes that Moffatt et al. '257 meets the requirements of the preset claims.

Applicants respectfully disagree. During the Interview held on March 23, 2007 with Examiner Callie Shosho, the pigments disclosed in Moffatt et al. '257 were discussed. In summary, Moffatt et al. '257 clearly teaches a modified pigment which is the reaction product of a polymerization reaction with the attached reactive groups, and a variety of suitable polymerization reactions are taught (see column 6, lines 13-15). For example, Moffatt et al. '257 teaches that the presence of the attached reactive groups allows the polymerization reaction to occur in water (see column 6, lines 7-9). Most importantly, Moffatt et al. '257 clearly states the reaction is a radical chain polymerization that occurs at the reactive group (see column 6, line 15-

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18). This is further supported by the extensive list of radical-polymerizable monomers which can be used (see column 6, line 27 to column 16, line 16).

Since polymerization occurs at the reactive group, the product of this reaction is the reaction product of the reactive group and a monomer. This is very different from the modified pigment comprising a pigment having attached at least one organic group of claim 21, wherein the organic group comprises the reaction product of at least one (2-sulfatoethyl)-sulphone group and at least one nucleophilic polymer. Furthermore, even if one views the product of Moffatt et al. '257 as the reaction product of the reactive group and a polymer, the polymer is not a nucleophilic polymer. No electrophilic/nucleophilic reaction occurs. The reaction product of a reactive group and a nucleophilic polymer would be expected by one skilled in the art to occur by reaction of the nucleophile of the polymer and the reactive group. This is not the product of Moffatt et al. '257.

Therefore, Applicants believe that claim 21 is not anticipated by Moffatt et al. '257. Furthermore, claims 22 and 24, which are dependent from claim 21, recite further embodiments of the present invention and, for at least the reasons discussed above, are also anticipated by this reference.

Regarding claims 34-35, claim 34 relates to an ink composition comprising a liquid vehicle and a modified pigment, wherein the modified pigment comprises a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of a pigment having attached at least one (2-sulfatoethyl)-sulphone and at least one nucleophilic polymer. For the reasons discussed in more detail above regarding claims 21, 22, and 24, Moffatt et al. '257 does not disclose this type of ink composition since the modified pigment of Moffatt et al. '257 is not the modified pigment of the present invention, which is the reaction product of a nucleophilic polymer. Rather, Moffatt et al. '257 teaches that the reaction is a radical chain polymerization that occurs at the reactive group.

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Therefore, Applicants believe that claim 34 is not anticipated by Moffatt et al. '257. Furthermore, claim 35, which depends directly from claim 34, recites a further embodiment of the present invention and, for at least the reasons discussed above, is also not anticipated by this reference.

Finally, regarding claim 40, this claim recites a method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form a pigment having attached a third chemical group. The first chemical group comprises at least one electrophile and said second chemical group comprises at least one nucleophile, or vice versa. The first chemical group, the second chemical group, and the third chemical group each comprises at least one organic group selected from a recited list. For the reasons discussed in more detail above, this is not the method of Moffatt et al. '257 since no nucleophilic reaction is disclosed, taught or suggested in this reference. Instead, Moffatt et al. '257 teaches a very different method in which the reaction is a radical chain polymerization that occurs at the reactive group and does not involve a nucleophilic group as recited in claim 40. Therefore, Applicants believe that claim 40 is not anticipated by Moffatt et al. '257.

Applicants therefore believe that claims 21-22, 24, 34-35, and 40 are not anticipated by Moffatt et al. '257 and respectfully request that this rejection be withdrawn.

#### Rejection of Claims under 35 U.S.C. § 103(a)

##### Claim 23

The Examiner has rejected claim 23 as being unpatentable over Moffatt et al. '257 (U.S. Patent No. 6,323,257).

In paragraph 8 of the Final Office Action, the Examiner incorporates by reference the rejection set forth in paragraph 10 of the Office Action mailed May 9, 2006. In that Office Action, the Examiner states that the difference between this reference and the present claimed invention is the requirement in the claim of a specific type of (2-sulfatoethyl)sulfone group. In particular, the Examiner states that Moffatt et al. '257 discloses the use of phenyl (2-methyl

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ethyl sulfonato) sulfone while the present claims require the use of phenyl (2-sulfatoethyl) sulfone, and these differ in that the compound of Moffatt et al. '257 contains a methyl substituent not present for the instantly claimed compound. However, the Examiner further states that, given the similarity between the claimed compound and that disclosed by Moffatt et al. '257, and given that the compound of Moffatt et al. '257 is used as a first chemical group on a pigment which is then reacted with a second chemical group, it would have been natural for one of ordinary skill in the art to infer that the presently claimed compound is just one obvious variant of that in Moffatt et al. '257 and to expect that compound of the reference would have similar properties as that claimed. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art that the phenyl (2-sulfatoethyl) sulfone disclosed in the present claim is but an obvious variant of the phenyl (2-methyl ethyl sulfonato) sulfone disclosed in Moffatt et al. '257, and thereby one of ordinary skill in the art would have arrived at the present invention.

Applicants respectfully disagree. Claim 23 depends directly from independent claim 21 and discloses a modified pigment comprising a pigment having attached at least one organic group, wherein said organic group comprises the reaction product of at least one (2-sulfatoethyl)-sulphone group and at least one nucleophilic polymer, and wherein the (2-sulfatoethyl)-sulphone group is phenyl-(2-sulfatoethyl)-sulphone. For the reason discussed in more detail above, while the first chemical group of Moffatt et al. '257 may be structurally similar to the phenyl (2-sulfatoethyl)-sulphone group of claim 23, the second chemical group of Moffatt et al. '257 is not a nucleophilic polymer as in claim 23. In addition it would not be obvious to replace the reactive monomers with a nucleophilic polymer since the reaction types disclosed are completely different.

Therefore, Applicants believe that claim 23 is patentable over Moffatt et al. '257 and respectfully request that this rejection be withdrawn.



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Claims 1, 5-9, and 12

The Examiner has rejected claims 1, 5-9, and 12 as being unpatentable over Moffatt et al. '257 (U.S. Patent No. 6,323,257) in view of WO 99/31175.

In paragraph 9 of the Final Office Action, the Examiner incorporates by reference the rejection set forth in paragraph 12 of the Office Action mailed May 9, 2006. In that Office Action, the Examiner states that Moffatt et al. '257 discloses a method of producing a modified pigment comprising reacting first chemical group such as (2-sulfatoethyl)-sulfone group with second chemical group, i.e. nucleophilic polymer such as polyalkylene glycol, in order to form third chemical group. In addition, the Examiner states that the difference between Moffatt et al. '257 and the present claimed invention is the requirement in the claims a) that the first chemical group is attached to the pigment using diazonium salt and b) specific type of (2-sulfatoethyl) sulfone group.

With respect to difference a), the Examiner states that Moffatt et al. '257 is silent with respect to how the first chemical group is attached to the pigment. However, the Examiner further states that WO 99/31175 discloses attaching chemical groups to carbon black using diazonium salt and that this reaction can occur in a variety of reaction conditions, in any type of reaction medium, and is compatible with a variety of functional groups. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art to use diazonium salt to attach the first chemical group to the pigment of Moffatt et al. '257, and thereby arrive at the claimed invention.

With respect to difference b), the Examiner states that Moffatt et al. '257 discloses the use of phenyl (2-methyl ethyl sulfonato) sulfone while the present claims require the use of phenyl (2-sulfatoethyl) sulfone, and these differ in that the compound of Moffatt et al '257 contains a methyl substituent not present in the instantly claimed compound. The Examiner further states that, given the similarity between the claimed compound and that disclosed by Moffatt et al. '257, and given that the compound of Moffatt et al. '257 is used as a first chemical group on a pigment which is then reacted with a second chemical group, which is the identical function of the presently claimed compound, it would have been natural for one of

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ordinary skill in the art to infer that the presently claimed compound is just one obvious variant of that in Moffatt et al. '257 and to expect that the phenyl (2-methyl ethyl sulfonato) sulfone of Moffatt et al. '257 would have similar properties as the phenyl (2-sulfatoethyl) sulfone presently claimed. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art that the phenyl (2-sulfatoethyl) sulfone disclosed in the present claim is but an obvious variant of the phenyl (2-methyl ethyl sulfonato) sulfone disclosed in Moffatt et al. '257, and thereby one of ordinary skill in the art would have arrived at the present invention.

Applicants respectfully disagree. For the reasons discussed in more detail above, Moffatt et al. '257 does not disclose, teach or suggest the method of claim 1 since it does not teach an electrophilic/nucleophilic reaction. Instead, Moffatt et al. '257 teaches a radical polymerization reaction that occurs at the reactive group. Thus, the method recited in claim 1 is patentable over this reference.

WO 99/31175 cannot cure the deficiencies of Moffatt et al. '257. In particular, Applicants believe that one skilled in the art would not combine these references since both Moffatt et al. '257 and WO 99/31175 each describe very different methods for preparing a modified pigment. For example, Moffatt et al. '257 relates to a radical polymerization method while, in the embodiments of WO 99/31175 involving a reaction of an attached group, WO 99/31175 teaches a) a method involving the esterification reaction of modified pigments comprising an aromatic acid group, and b) a method involving the exchange of a counter-ionizable group having at least one organic group, monomeric group, or polymeric group. Since the reaction methods are so different, Applicants do not believe that one skilled in the art would be motivated to combine these references.

Even if one of ordinary skill in the art were to combine these references, Applicants do not believe the resulting combination would result in the presently claimed invention. Rather, one might use the diazonium salt, as taught in WO 99/31175, to attach the groups shown in Moffatt et al. '257. However, while the first chemical group of Moffatt et al. '257 may be structurally similar to the phenyl (2-sulfatoethyl)-sulphone group of the present application, the

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second chemical group of Moffatt et al. '257 does not comprise at least one electrophile or nucleophile, as in the present claims. In addition, it would not be obvious to replace the reactive monomers of Moffatt et al. '257 with a second chemical group comprising an electrophile or a nucleophile since the reaction types are completely different. Thus, even in combination, the result would not be the method of present claim 1.

Therefore, Applicants believe that claim 1 is patentable over Moffatt et al. '257 in view of WO 99/31175. Furthermore, claims 5-9 and 12, which are directly or indirectly dependent from claim 1, recite further embodiments of the present invention and, for at least the reasons discussed above, are also patentable over this combination of references.

Applicants therefore believe that claims 1, 5-9, and 12 are patentable over Moffatt et al. '257 in view of WO 99/31175, and respectfully request that this rejection be withdrawn.

#### Allowable Subject Matter

In paragraph 11 of the Final Office Action, the Examiner states that claims 15, 17-18, and 25 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants are grateful for the allowable subject matter. However, as discussed in more detail above, Applicants believe that claim 1 is in condition for allowance. Claims 15, 17, and 18, which depend indirectly from claim 1, should therefore also be in condition for allowance. Furthermore, Applicants also believe that claims 5-14, 21-15, 34-35, and 40 are also in condition for allowance, as discussed in more detail above.

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Conclusion

In view of the foregoing remarks, Applicants believe that this application is in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would further expedite the prosecution of the subject application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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